

IV. REMARKS

New Fig. 8 corresponds substantially to Fig. 18 of U.S. Patent Nos. 5,624,519 and 6,270,104 which are already of record in this case, having been incorporated by reference in the specification and described in paragraphs 0005, 0017 and 0021. The Figure is not new matter as it corresponds to the disclosure incorporated by reference. The reference to Fig. 8 substantially corresponds to the aforementioned Fig. 18 of the patents incorporated by reference.

With respect to the comment in the Office Action generally, “the drawings must show every feature of the invention specified in the claims.” New Fig. 8 and existing Figs. 2 and 6 adequately comply with the rule. The second sentence in Rule 1.83 permits the use of conventions such as the graphic presentation and reference numerals. The conventions known to one of ordinary skill, like the use of graphite bundles and sheets or laminations (Exhibit A) satisfy this rule.

Regarding the disclosure’s adequacy to support the specific claim elements,

(1) high modulus fibers, and the high modulus fibers being arranged in laminations of 0-45-90 degree alignments, as set forth in claims 1 and 17 are described in the specification in paragraphs 0017, 0021, 0026 – 0027 and in detail in the patents 5,624,519 and 6,270,104 incorporated by reference, and now in Fig. 8.

(2) various properties of the walls in “the second laminations and first middle laminations forming quasi-isotropic walls due to the direction of the fiber orientation, as set forth in claim 4” are described in the specification in paragraphs 0020, 0026 and in the strength properties and fiber orientation detail in the patents 5,624,519 and 6,270,104 incorporated by reference, and in Fig. 8;

I. Drawing Amendments

Please amend the drawings by adding the accompanying Fig. 8.

(3) “three zero degree fiber bundles, as set forth in claims 5 and 17” are described in the specification in, for example, paragraph 0028, and shown by reference numbers in Fig. 2 and 6, in a conventional manner adequate for one of ordinary skill to practice the invention; (the generic concept of use of bundles being known to one of ordinary skill, although the teachings of claims 5 and 17 are a nonobvious combination).

There is no need for the features to be canceled from the claims. They were adequately disclosed to one of ordinary skill in the original application. No new matter is submitted.

The corrections for grammatical clarity and to correct minor spelling errors have been made in the specification and the claims.

With respect to the “method” inclusion in claims 1 and 4, to the extent that is understood to encompass the convention of using “formed” in the apparatus claim 1, amendments attempt to eliminate that convention.

To the extent the convention remains, however, it is believed appropriate and consistent with the way the claims are written, due to the unique nature of composite structures. Forming a composite structure by overlapping laminations, for example, when, as is known to one of ordinary skill, the matrix is cured into a monolithic structure, is inherent in fiber alignment and the mechanical proprietor of its composite structure.

The “more easily machined” limitation of claim 1 is redefined in a manner that will be clear to one of ordinary skill in carbon fiber composite arts.

Claims 3 and 4 have additionally been amended to clarify the particular laminations present. This is for clarification not avoidance of prior art.

New claim 18 substantially conforms to original claim 1, but without the "machining" and "plug" limitations. New claims 19 – 21 depend from 18 in the manner of original claims 2 – 4 from original claim 1.

It is believed that all outstanding issues have been addressed and the application should be in condition for allowance.

Respectfully submitted,



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THE FIBERGLASS BOAT REPAIR MANUAL

ALLAN H. VAITSES

with illustrations by Ed Davis



International Marine Publishing Company
Camden, Maine

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through hulls to be fiberglassed directly to the hull and deck. If you are repairing a boat on which such parts cast in bronze have failed or been broken out, you might consider replacing them with tubes made of fiberglass, which can be "welded" with fiberglass right to the hull or deck and which will not deteriorate or loosen up for the indefinite future if properly installed. You can buy them or you can wind them yourself (see Chapter 8). But back to the discussion at hand.

The advanced or "super-reinforcing" materials

You will hear much about exotic materials that add properties beyond the capabilities of fiberglass. Called "advanced composites," they are not new, having been used in aerospace work for years, but they are creeping into boatbuilding slowly, as cost comes down and as high performance requirements make them essential. While you are unlikely to need them on 99 percent of the fiberglass boats built to date, the time will certainly

come for some of them. Meanwhile, if you know about them, those word droppers who always have to be one up on everybody won't make you feel ignorant by asking, "Why don't you fix your boat with such and such? It's much better, you know."

S glass is a stronger, stiffer, and tougher glass than the E glass that has been standard to date. It is also more expensive. It's easy to work with, and weighs about the same. It is only needed on high-performance boats to gain strength with light weight.

Ceramic fibers are almost as strong as S glass, but their greatest asset of resisting temperatures up to 3,000°F is of limited worth on your boat. At their current price of about \$90 per pound, I doubt you'll want them anyway.

Carbon (or Graphite) fibers are expensive but very light, and worked into certain parts of an ordinary laminate they can add tremendous stiffness and tensile strength (Figure 1-5). They can improve the strength-to-weight ratio of highly stressed parts, but except for ultrahigh-performance power and

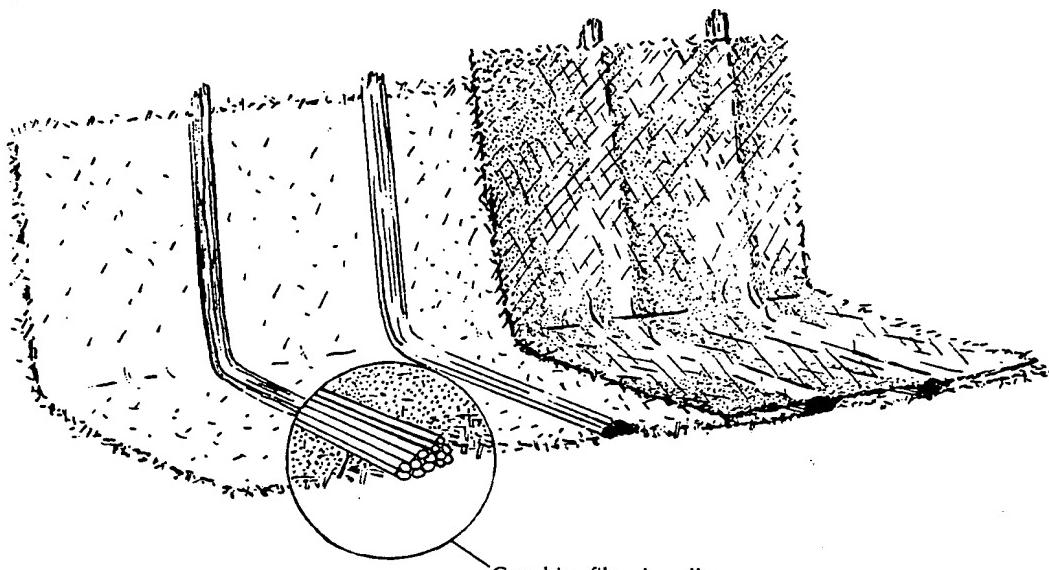


Figure 1-5. Graphite fiber bundles reinforcing a corner where great strength is needed and weight must be kept down.

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